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Organizational Impact Analysis Handbook

A Guide for Analyzing the Impacts of Implementing Information Technology in IRS Offices

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FOREWORD

This Organizational Impact Analysis (OIA) Handbook is a procedural guide supporting the Human Factors Life Cycle in automation projects.* This guidance supplements the Systems Development Methodology adopted by the IRS for automation initiatives and promotes the integration of technical concerns with human and organizational concerns in achieving a successful total work system.

The OIA Handbook was developed by the Human Resources Technology Staff of the Assistant Commissioner (Human Resources Management and Support) (HRMS) with contributions by other HRMS staff, and staff of the Assistant Commissioners, Information Systems Development, and Computer Services, as well as staff in several information systems projects.

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* The Human Factors Life Cycle and System Development Methodology are described in the Draft Project Management Guide (July 1988) (Document 7357). Other supporting documents include "A Guidebook: How to Introduce Ergonomics in IRS Automation Projects" (Document 7010), and a document in preparation, "Work System Designer's Handbook."

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ORGANIZATIONAL IMPACT ANALYSIS HANDBOOK

INTRODUCTION

The Organizational Impact Analysis (OIA) was designed as a procedure for the use of cross-functional teams in determining what impacts a new automation project will have on the organization, and what support the project needs from the organization. The OIA also serves as an additional means of communication between the project staff and intended users of the automation system. This dialogue can yield new information that can be factored into decisions in the course of the project.

This Handbook starts with a "question-and-answer" format to clarify the use of the OIA. Then, a list of action steps is given in Part II, supported by extensive data-gathering tools appearing in Appendix B.

An OIA can be carried out profitably in automation projects of any size; it is required in projects that are subject to the Systems Development Methodology. As an example of the issues an OIA raises, suppose that a proposal is made that all field Revenue Officers begin keeping files and working cases on portable personal computers. How will that new technology impact on the design of the job? On its required skills? On workload? On organizational structure? On job classification? On success in recruiting for the job? How will the technology interface with other information systems? What changes will be experienced by supervisors? By clerical employees? By taxpayers? As the project unfolds, what support will the project team need from other IRS organizations that have functional specialties in areas such as telecommunications, facilities management and data security? This guide will help you find answers to such questions, as well as raise other questions that should be considered.

PART I. QUESTIONS AND ANSWERS ABOUT THE OIA

Q.1: What is an organizational impact analysis (OIA)?

Answer: An OIA is an assessment of:

-- the likely effects of proposed or newly installed information technology;

-- on the users and managers of that technology, as individuals;

-- and on their organizations and key related organizations.

Q.2: What does the term, "information technology" (as used in the answer above), cover?

Answer: Information technology is the system of hardware, software, telecommunications and operating procedures used to "automate" work. This new system usually replaces a previous work system, with the expectation of improved effectiveness and efficiency. Installing information technology, therefore, involves designing or redesigning total work systems, to include job design.

Q.3: What effect can we expect the introduction of information technology to have, in OIA terms?

Answer: The most critical effects are on:

-- users' job performance;

-- users' job satisfaction;

-- the organization's effectiveness;

-- the amount and kind of support needed by the user organization (such as A/C Collection) and the "technology-installing" organization or project (such as ICS) from support organizations (such as A/C HRMS and A/C Computer Services);

-- relationships between the using organization and other tax-processing organizations, and;

-- service to the taxpayer.

Q.4: What is the purpose of the OIA?

Answer: The OIA has three distinct purposes:

(1) The first purpose concerns the impact of the proposed work system on its users. The OIA is used to draw an accurate picture of the present work system in terms of its effect on users, and to then project how the proposed changes, insofar as they have been spelled out, might affect users regarding their work efficiency, well-being and job satisfaction.

(2) The second purpose of the OIA is to identify the desired conditions under a future system and recommend alternative work system design features, if necessary. A key source of information in this second activity is operational employees and managers in the intended user functions. The objective of this part of the OIA activity is to make sure that this kind of user input is incorporated in project decisions, along with other kinds of user input that may exist, such as user members on the project staff.

(3) The third purpose of the OIA is to identify the support activities that will be needed by the project to achieve these desired conditions. This includes support from HRMS and Computer Services, but may also involve other Assistant Commissioner areas and contractors.

Q.5: Who "owns" the OIA?

Answer: The OIA is introduced in the Draft Project Management Guide (PMG)(Document 7357, p. 3-20) as "...a counterpart of the Economic Analysis for the non-technological (organizational and human) aspects of an information systems project. The OIA is the first HRMS-related task for which the Project Manager has primary responsibility." It is important that the project staff is the driving force behind the OIA, so that the OIA effort and findings are considered of equal criticality to other project activities. The OIA is done by members of the project team, joined by representatives of support functions (including HRMS and Computer Services) and user groups. These designated members are formed into a cross-functional OIA team.

Q.6: Who provides leadership for the cross-functional OIA team?

Answer: The PMG (p. 3-22) recommends that: "The Project Manager has primary responsibility for initiating, monitoring the progress of, and completing the OIA. The AC (HRMS) provides technical guidelines and appropriate expert support to complete this document." Because of this, leadership by a project staff member would give the project the advantage of control and coordination. As an alternative, a team member from HRMS or other support function could take the lead, but experience has shown that project involvement is less intensive in those cases. This can result in less satisfactory communication with project decision-makers, access to project data, and timeliness in information flow between project management and the OIA team.

Q.7: When should an organizational impact analysis be done?

Answer: The OIA is one of the earliest project activities. It is part of the Requirements Analysis Package (RAP), which is prepared during the initiation phase. The reason for doing an OIA early is so that we can ask the question, "What combination of skills and information technology will be most effective in getting the job done, while satisfying the employee and the customer?" (As part of the RAP, the OIA may have to analyze several different possible information technology packages). This is preferable to asking the question, at some later date in the life of a project, "What impact will a proposed technological 'package' have on employees and customers, and how can we minimize any negative impact?" This latter question is unfortunately asked from the point of view that the technology is a "given," and that decisions regarding human factors will be made reactively rather than proactively. Instead, we need to be just as proactive about human factors decisions as we are about technical ones.

A project has a powerful advantage when an OIA team has a strong role in the initiation phase. It ensures that the right people are present ("in the same room") to consider project goals in the context of an open system as described on page 1-15 of the Draft Project Management Guide (July 1988) (Document 7257). The OIA team, composed of "the right people" (people representing knowledge of, interest in, and orientation to several, not few, disciplines), is able to explore a wider range of issues with other system designers concerning visions and goals for the project than would normally be the case.

The OIA is an iterative activity -- the first OIA report should be considered only the first of several, because project conditions constantly change as new information is developed, and decisions are made. Project managers always face the dilemma of conducting a planned activity within commitments of resources and timelines, yet at the same conducting a *creative* activity, which involves building something that has not been built before. The OIA can be especially helpful in this dilemma. Repetitions of the OIA at key points in the project life cycle, linking them to activities such as task analysis, and work system design and evaluation, are an excellent way to get new information that integrates technical and human factors concerns. These follow-up OIA's then build on each other, sharpening the data that point to certain design needs.

Q.8 What happens when we have to start the OIA process "mid-stream" in a project?

Answer: For projects where circumstances have precluded the early start of an OIA, the best we can do is react to work system features already in place, and turn attention to the decisions that remain to be made. Because the OIA is most effective as an iterative activity, OIA's can be done at almost any stage of a project and still have cost-effective payoff. For example, suppose that new facts are surfaced about problems and restrictions in the job market. To compensate, the technology might be adjusted so that good overall system performance can still be attained using skills that are quite different from those originally envisaged by system designers.

Q.9 What is the working style of a cross-functional OIA team?

Answer: First, as more and more projects gain experience with cross-functional teams, they have found that developing OIAs is only one useful activity of the team. Instead, they come to see themselves as "cross-functional *support* teams," and through this vehicle are able to exchange information, identify issues, gather needed data and recommend actions on many project issues that arise, especially those that cut across functions of the parent organization. Working in this way, the team sees itself having a life virtually as long as the project itself, with more or less team activity as needs arise.

Since the team consists of a group of specialists from several disciplines, and effectively of equal rank, the most effective style for the leader to assume is one that is facilitative, not directive. The team typically reviews issues in whole-group discussions, then takes away assignments as individuals or as sub-groups. The team meets regularly to pool contributions, and to decide when to collect new data and make new recommendations to project management.

Q.10 How are the results of the OIA reported?

Answer: The results of the OIA are usually written up in the form of a report to the project manager. This report usually contains an executive summary, background, methods used in the OIA, findings and action recommendations.

Q.11: How are the results of the OIA used?

Answer: For its greatest value to be realized, the recommendations of the OIA must be specific and practical, and they must be given serious consideration by the project manager and the functional user organization. The OIA will have real influence when the process is respected for its logic and the investment of staff expertise it represents. Some specific uses of the results are as input to the Statement of Work, Request for Proposal and the Resources Allocation Package. Another common use is to provide a basis for estimating workloads that will be created by the support needs of the project.

PART II. ACTION STEPS NEEDED TO START AN OIA

Step A. Identify Information Sources

1. Written documentation.

Documentation includes a wide range of materials prepared for both the present and proposed work systems. Most information technology systems are not designed to be a total "scrapping" of the existing system. Neither should they be simply "automating the work as it is done today." In any case, useful information for OIA purposes can often be found in the mission need statement (MNS), the project charter, statement of work (SOW), IRM references, position descriptions, training needs analyses, etc. In collecting and initially reviewing this information, consider gaps in coverage, conflicting data, and questions raised that other documents may answer.

2. People impacted by the project.

(a) End users

Who is the end user? Clearly, one kind of end user is any employee affected by the work change. In addition, it can be helpful to consider an affected occupational group or entire organization as the end user. These are the targets the new system is intended to help.

In the OIA, we identify the end user in order to tap an important source of information, as well as to get their "buy-in" to the eventual job changes. Even though the user is represented on the design team (project staff detailees, OIA team, user groups), there are so many users in so many different situations that sampling "end users" through the OIA is an important basic means of keeping the project focussed on the user.

(b) Affected organizations

Offices and managers/representatives in other organizations who will have some role in either exchanging information with the new work system, or will have key involvement in the development project, for example, as support functions.

(c) Vendors.

Vendors often have a key role as designers, suppliers, coordinators or maintainers of part of the new work system.

(d) "Other" users

Considering all that you find out in this early data-gathering, do there appear to be other users, beyond the original intended or envisaged "target group," who will be affected to a substantial degree?

Step B. Choose Information-Gathering Techniques

This is where we turn to many of the traditional "analyst" techniques in order to focus on certain topics and on selected sources of information. Two major concerns here are *representativeness* (Are we reaching a fair cross-section of the people or documents?) and *economy* (Are we hearing enough points of view about the topics, but not wasting time or being redundant?). The major techniques that are useful here are:

1. Review of documents
2. Interviews with individuals
3. Meetings with groups -- "focus groups" or other structured meetings to gather data, opinions or ideas
4. Questionnaires
5. Observation

For projects which have reached a later stage of completion by the time of the first OIA, or where one or more repetitions of the OIA are planned, additional data-gathering opportunities are:

6. "Usability labs"
7. Prototypes
8. Pilots

Step C. Focusing Information Gathering

When facing the many options you have for investing your time and other resources as you begin data-gathering, it is helpful to have a plan that will target your efforts. It may be more efficient to focus on one area of investigation at a time.

Earlier, we equated the undertaking of an "automation project" (that is, developing an information technology system to process some of the work of an organization), with the design or re-design of a work system. An overview of the issues involved in work system design in an organization like the IRS is shown in Appendix B.

The issues shown in Appendix B are clustered into groups that relate to the way automation projects are managed in the IRS, and that correspond to our organizational realities. For example, most automation projects have an impact on position descriptions, or "PDs.". In the world of Federal employment, the writing and maintenance of PDs is very important. Accordingly, one of the clusters in Appendix B is titled, "Job Configuration," and includes the topic of position descriptions.

Two types of clusters are shown:

"Process" clusters -- those that concern the management of the project and the key activities and working approach of the project team:

1. General Project Management
2. Building the Project Team
3. Using a Work System Design Process
4. Ensuring Employee Participation
5. Ensuring System Usability
6. Managing Implementation and Change

"Criteria" clusters -- those that concern the desired qualities of the end product of the project, that is, the work system being designed:

1. Functional and Organizational Specifications
2. Job Configuration
3. Performance Appraisal and Feedback
4. Rewards System
5. Software Ergonomics
6. Workplace Design
7. Job Instructions
8. Work Environment
9. Workforce Planning
10. Supervisory Practices
11. Training
12. Career Paths
13. Accommodation of Employees With Disabilities
14. Records Management

A summary of the clusters follows. For reference, the process clusters will be numbered P-1, P-2, etc., and the criteria clusters C-1, C-2, etc.

P-1 General Project Management

A project needs to be adequately funded and supported by the rest of IRS. It needs to have good relationships with all of its "stakeholders," such as vendors and users, and it needs to have comprehensive work plans for the life of the project.

Support for a project often includes the following, with additional services for the special needs of some projects:
(a) liaison with all those with a special stake in the project;
(b) defined roles for field users and field support offices;
(c) contracting; (d) space acquisition and site preparation;
(e) telecommunications; (f) records management; and (g) forms and publishing services.

P-2 Building the Project Team

The project staff works as a team, and is unlike a traditional organization in several ways. Some of the most important differences are the cross-functional background of team members, and user representation on the team. The working style of an effective project team is also different, and is enhanced by team-building.

P-3 Using a Work System Design Process

Projects that set out to design or redesign a work system start from some functional or business need. In the IRS, this translates to some aspect of tax work, or work supporting tax processing, that must get done more efficiently, through the exploitation of information technology. This process starts by making a "bare-bones" sketch of functions and tasks, connected by flow lines to show how the work progresses to completion. The focus is on the work done, not on the technology being used. The challenge is to integrate the technology with the needs, "limitations" and other characteristics of the employees who will be part of the total work system.

To achieve this integrated design, the project team needs to use specific work system design principles. These principles are not traditional, and techniques for application are not fully developed; however, projects can apply the principles and refine applications as they proceed. (See the "Work System Designer's Handbook.")

P-4 Ensuring Employee Participation

In the IRS today, the success of a new automated work system depends partly on employee acceptance and active support. This can be cultivated most directly by including some of the intended users of the new system in the project team, as noted above. This needs to be augmented by involving more users in other ways, however, because of their large number and wide dispersion throughout the Service. In addition to direct users, many other employees are impacted. They need to be included in the activities of the project in many ways, such as "internal marketing" and union involvement.

P-5 Ensuring System Usability

One of the most powerful things a project team can do to achieve its goal is to test the new work system realistically during development, and revise it if it does not perform as needed. To test a work system realistically requires non-traditional methods. The new methods must focus on the work done by the user as much as on the work done by the non-user part of the work system.

One relatively new method that clearly does this is called a "usability laboratory." This method requires specialized facilities and testing procedures designed to reveal clearly what happens at the interface between the user and his or her workplace tools. This approach or alternative approaches need to be used by projects to examine usability.

P-6 Managing Implementation and Change

From the beginning of the project, the target of all the project activity is to eventually deliver a new work system to field sites, where it will be taken over and "owned" by users at those sites. Although there should be constant preparation for this transfer throughout the life of the project, for example, through user participation, there are important project phases such as space acquisition and site preparation that are especially critical and highly visible. Flowing from these is the necessary transition to management by local site personnel, and applying staffing and support resources to enable full-scale operation.

C-1 Functional and Organizational Specifications

The new work system must have a mission statement that is clear and useful. It must have efficient spans of control and reporting relationships. Spans of control must be large enough to be economical, but small enough to give support. Chains of command need to be responsive. The staffing patterns must provide the type and grade of positions that get the job done economically. Relationships among jobs and grades need to be logical and fair.

C-2 Job Configuration

The description of the work in terms of functions and tasks needs to be further fleshed out to define the jobs, both traditional and newly-created, that are necessary. The jobs are defined by a coordinated set of specifications, which include position descriptions, critical elements and performance standards.

Performance standards must be developed for each job as part of the design process to establish the overall target performance level of the work system. In the analysis to determine appropriate standards, the potential contribution of the employee to work system performance is a separate issue from the potential contribution of the automated data processing functions of the system. The "machine should not drive the job," if that causes excessive labor costs due to disliked jobs.

C-3 Performance Appraisal and Feedback

The best time to develop methods of appraising the performance of employees is along with the design of the other features of the work system. Each job must have a clear, efficient means of measuring performance and making use of this information to satisfy the needs of management and the employee.

The employee needs timely information on personal performance that is clear and fair, in order to know "where he or she stands." Management needs accurate and comprehensive information that it can use to make decisions about system adjustment. Also, a clear, fair system will help them motivate employees to meet performance standards.

C-4 Rewards System

"Rewards" refers here to all forms of compensation or gain experienced by the employee, including pay, bonuses, awards and benefits. The rewards system is one of the most powerful determinants of employee motivation. A "rewards package" for the employee needs to be keyed to performance standards and the design of appraisal methods, but also needs to take advantage of creative ideas.

C-5 Software Ergonomics

Ergonomics has been defined as "... the interaction between human beings, the equipment they work with, their work environment and how each element influences the others during the work activity." Several of the clusters discussed here have issues that can benefit from the application of ergonomic design principles. The design of the software from an ergonomic point of view is especially important in automated work systems.

The interface between employee and computer, by means of the keyboard and screen, involves the employee's exercise of control over his or her work, in the most minute detail. Through software design, a balance or dialogue is established between user and computer as one or the other initiates an action or gives a response. Getting this balance right is at the heart of optimizing the work system's technical and human potentials for maximum system output at a realistic cost.

C-6 Workplace Design

Traditional job specifications tend to address only partially the design of the job from an ergonomic perspective; that is, providing a workplace environment that accounts for the wide range of employee needs. Ergonomic analysis and design focuses on these needs. These include space, movement, logic of use, and many others, aimed at improving comfort, minimizing fatigue, increasing job satisfaction and ultimately increasing the product quantity and quality delivered by the employee.

C-7 Job Instructions

No matter how carefully the work system and the individual jobs are designed, once the system is "on line," the history of the development tends to be lost, and the only remaining guidance for users is instructional material of various kinds. This material includes desk guides, job aids, printed and electronic forms used in the work process, training documents and the IRM. It is important that these materials be clear and non-contradictory. They should be easily accessible and up-datable. This is an important project responsibility requiring cross-functional coordination.

C-8 Work Environment

There are several important aspects of the larger work environment in addition to those identified in the "Workplace Design" cluster, above. These concern features of the physical environment that support the comfort and health of the employee, and provide services to meet important employee needs. Examples are: air quality, safety, physical security, health and fitness programs, child care and counseling.

C-9 Workforce Planning

In staffing the new work system, we need to draw from both the internal work force and the external labor pool. In both cases, a database of demographics needs to be established to show the "knowledges, skills and abilities" represented among available candidates. This is a starting point for the traditional tasks of recruiting, selecting and training employees. In addition, programs supporting the new work system need to be designed to assure professional development of employees, succession planning and any redeployment actions caused by the project.

C-10 Supervisory Practices

Information technology brings with it new responsibilities for supervisors and managers, and the need for them to develop new skills in areas such as: (1) introducing employees to change; (2) involving employees in the implementation, fine-tuning and "ownership" of the work system; and (3) helping to facilitate union involvement in the new labor relations issues.

C-11 Training

Traditional training support such as needs analysis, initial training and cross-training apply to the design and development of new work systems. Also, information technology provides an opportunity for *embedded training*, which has advantages of flexibility and data processing power for the varying needs of users in transition to "automated" work.

C-12 Career Paths

Each job that is part of the new work system should have career potential to help make it attractive to employees. This requires, in addition to career-related issues mentioned above, a planned relationship between the new jobs and others in the organization. Development of career ladders and programs of cross-training would help to achieve this.

C-13 Accommodation of Employees With Disabilities

Traditionally, jobs are modified well after they are structured and implemented, whenever a need arises to accommodate employees who fall outside the range of employees considered "normal" in various qualities, such as vision, hearing, speech, mobility or language skills. However, the design process for work systems should look ahead to the need to accommodate these employees, who make up a part of the Service's workforce that is substantial, and likely to grow. This accommodation starts when responding to issues in the "Job Configuration" cluster, and needs to carry through when making several other design decisions, such as those concerning performance standards and workplace design.

C-14 Records Management

The management of records is especially complex for automated work systems because of the need to manage a mixture of paper and electronic records. Also, as more and more paper forms are replaced by electronic images, there is a need to develop and prove out new guidelines and methods for the verification, storage, retrieval and disposal of the growing proportion of the new type of records.

Step D. Ask Preliminary Questions

The list of clusters in the previous section, especially the 14 "criteria" clusters, provides a guide to asking questions in the OIA. In fact, examples of recommended questions in each area are given in Appendix B.

However, resources are always limited, and the OIA must be targeted for the best payoff. Therefore, before planning a long list of specific questions, we should ask some preliminary questions such as those below to help target areas where further data-gathering is likely to be of most use.

1. Who is likely to be impacted?

2. How will the impacts change the way work will be done by the end user?
(Documents such as a recent task analysis and procedures manual help to supplement and expedite interviews. If these are not available, they need to be created in as thorough a form as resources allow).

3. What will be the nature of these changes in each relevant area of investigation (e.g., in performance appraisal, workplace design, training, etc.)

(a) Will the change be positive or negative? (Give specific examples.)

(b) Will the changes be short term or long term?

(c) What people/positions will be impacted?

Step E. Ask Specific Questions

Lists of specific questions useful in the OIA are given in Appendix B. These are the Diagnostic Questions for each of the 14 "Criteria Clusters." As an alternative, similar questions can be drafted to suit the specific OIA being conducted.

Bear in mind the objectives of the OIA: (a) to describe the present work system and the probable impacts of the proposed changes on users; (b) to identify, with the help of users, desired features of the new system to supplement project information; and (c) to identify needs of the project for support activities from support functions. (See Question 4, in the first section of this Handbook).

The emphasis in the OIA is on fact-finding and data-gathering (including the opinions and ideas of users and others affected by the change), rather than on developing designs and evaluating them. That comes later, in project phases devoted to those tasks. However, the OIA team needs to have in mind a general set of values or targets for good work system design.

To help keep in mind these targets against which the new design will ultimately be measured in the many design areas, quality indicators are shown in Appendix B for each of the clusters. Also, the Work System Designer's Handbook is a useful reference.

Step F. Analysis and Interpretation

Review all data, noting priorities for action and need for further data. Make quantitative analyses where possible (spreadsheets, averages, ranges, before-after differences). Use graphical presentations where possible (bar charts, pie charts). Borrow from the techniques of the Quality Improvement Process where useful.

Step G. Report of Findings

Use a simple report format such as: Summary of Recommendations; Method; Findings with Recommendations; Appendices.

Where possible, identify in the report, for each recommendation, who on the project staff or in supporting organizations could use the information and act on it.

Select two or three members of the team to deliver the report, with a brief oral summary, to the project manager. Discuss with the project manager at this time the future availability and role of the team. Point out the advantages to the project of maintaining an on-going "cross-functional project support group" that will apply a process similar to that used for the OIA, in an iterative way as project needs evolve.

BRIEF OVERVIEW OF THE OIA METHODOLOGY

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1. Designate the OIA team.

   - Balanced membership from project, HRMS and other support organizations
   - Small enough to form a face-to-face working group, approximately 5 to 10 members
   - Members need to have investigative and analytical skills, and access to decision-makers in their organizations
   - Members need to be committed to meeting regularly throughout the process

2. Identify initial scope of OIA issues.

   - Review written documents such as the project charter and statement of work
   - Interview or brainstorm with project staff, users, vendors and support organizations
   - Focus on the type of impacts (e.g., users' job satisfaction, communication, project support needed) described in the OIA Handbook
   - Limit the initial scope to a manageable list that will result in data to guide expansion of the OIA to relevant areas

3. Identify information sources.

   - Identify further written documents relevant to impacts
   - Choose a targeted sample of project staff, users, vendors and support organization staff likely to have information and viewpoints relevant to project decisions affecting impact areas

4. Choose information-gathering techniques.

   - Consider feasibility and cost-effectiveness, and choose interview, questionnaire, observation as appropriate

5. Get answers/data for "impact" questions.

   - Conduct site visits and record data, adjusting scope as needed in response to findings

6. Analyze and interpret data.

   - Summarize, indicate magnitude, priority, interrelationship of findings

7. Document the analysis and make recommendations.

   - Report to project manager and make recommendations in the format of an action plan

8. Follow up and repeat steps as needed.

   - OIA team can continue to function as a cross-functional analysis and planning group to facilitate getting its recommendations implemented

   - This group continues to apply the OIA process at relevant points in the life of the project as needed in response to developments.

ISSUES IN DESIGNING AUTOMATED WORK SYSTEMS

The purpose of the clusters defined below is to show the work system design issues that need to be addressed in information technology projects (projects that have the goal of designing and implementing an automated work system). These are the issues that are faced by project staffs, and are also dealt with by cross-functional project support groups doing organizational impact analyses (OIAs) and other tasks involving the design and evaluation of work systems.

Two kinds of clusters are shown:

(1) "Process" clusters (there are 6 of these)

These are the processes used within the project to help design the new work system. The issues identified here are concerns of the project manager and staff in trying to achieving effective teamwork. Also, they are a guide to some of the special methods of work system design, including employee involvement, usability analysis, balancing of technical and non-technical factors, and managing change.

Teams performing an OIA may gain a better understanding of how projects function by reviewing these process clusters.

(2) "Criteria" clusters (there are 14 of these)

These are criteria that spell out the desired features of new work systems. Their uses are:

(a) setting values, directions and targets for the design effort;

(b) comparing each alternative high-level design proposal against the criteria, in a "selection matrix" to help set initial development direction;

(c) predicting organizational impacts;

(d) evaluating work system performance in prototypes and pilots.

The clusters described in the following pages are:

Process Clusters

1. General Project Management
2. Building the Project Team
3. Using a Work System Design Process
4. Ensuring Employee Participation
5. Ensuring System Usability
6. Managing Implementation and Change

Criteria Clusters

1. Functional and Organizational Specifications
2. Job Configuration
3. Performance Appraisal and Feedback
4. Rewards System
5. Software Ergonomics
6. Workplace Design
7. Job Instructions
8. Work Environment
9. Workforce Planning
10. Supervisory Practices
11. Training
12. Career Paths
13. Accommodation of Employees With Disabilities
14. Records Management

For each cluster, the following are given:

(a) a brief narrative *description*; and
(b) a list of *issues* that are related to the cluster, and are important to consider throughout the project.

Also, for the criteria clusters, a list of *diagnostic questions* is given. These are offered as data-gathering tools for teams performing OIAs, simply as a "starter" list. Each OIA team will be able to add and modify questions to suit the needs of its own project.

PROCESSES USED BY PROJECTS

"Process" clusters are those that concern the management of a project and the key activities and working approach of the project team.

These are activities of a project that produce its assigned product: an automated work system. The process clusters have been designed to focus on the three components of a work system, and on the task of integrating them: hardware, software and employees.

(Process Clusters are described starting on the next page).

Process_Cluster_1

Title: GENERAL PROJECT MANAGEMENT

A project needs to be adequately funded, staffed and supported by the rest of IRS. It needs to have good relationships with all of its "stakeholders," such as vendors and users, and it needs to have comprehensive work plans for the life of the project. Projects often have an oversight group, such as an "Information Systems Control Group."

Support for a project often includes the following, with additional services for the special needs of some projects: (a) liaison with all those with an important stake in the project; (b) defined roles for field users and field support offices; (c) contracting; (d) space acquisition and site preparation; (e) telecommunications; (f) records management; and (g) forms and publishing services.

ISSUES:

Project fiscal and budget issues
Project support and workload issues
Project relationships with: A/C areas / field functions and offices / vendors / taxpayers / "third parties" such as preparers, banks, attorneys / other government agencies / other information systems and information systems projects / other stakeholders
Contracting
Project work breakdown structure

Process Cluster 2

Title: BUILDING THE PROJECT TEAM

The project staff works as a team. A team is defined as a group that shares a common mission, and whose objectives are to produce something to which each team member has contributed. In a project management environment, it is common to find a central project team that functions for a long period on a continuous, day-to-day basis; this team can be supplemented by smaller teams, some of which function intermittently.

Project teams function differently from traditional organizations. They are more fluid in their work processes. An effective working style for a project team can be developed and enhanced through special team-building processes. Team members are free to communicate up and down organizational lines within the team, and across them. Usually, a range of cross-functional expertise is represented on the team. Team membership may change with some regularity. Also, a project has a beginning and an end. There is an atmosphere of creativity and innovation in such a project environment. Team members communicate directly with customers and other users of their products to seek input.

ISSUES:

Project staff selection and composition
User representation on the project
Project staff team-building
Formation of cross-functional teams supporting the project
  (e.g., OIA teams, work system design and evaluation teams)

Process_Cluster_3

Title: USING A WORK SYSTEM DESIGN PROCESS

Projects that set out to design or redesign a work system start from some functional or business need. In the IRS, this translates to some aspect of tax work, or work supporting tax processing, that must get done more efficiently, through the exploitation of information technology. This process starts by making a "bare-bones" sketch of functions and tasks, connected by flow lines to show how the work progresses to completion. The focus is on the work done, not on the technology being used, or being considered. The challenge is to integrate the technology with the needs, "limitations" and other characteristics of the employees who will be part of the total work system.

To achieve this integrated design, the project team needs to use specific work system design principles. These principles are not traditional, and techniques for application are not fully developed; however, projects can apply the principles and refine their own applications as they proceed. (See the "Work System Designer's Handbook.")

ISSUES:

Business area analysis
Environmental scan
Requirements analysis (RAP)
Data flow analysis
Linkages among components of the work system
Technical work task determination and configuration
Analysis of human factors, "social" and organizational
 relationships and dynamics

Process Cluster 4

Title: ENSURING EMPLOYEE PARTICIPATION

In the IRS today, the success of a new automated work system depends partly on employee acceptance and active support. This can be cultivated most directly by including some of the intended users of the new system in the project team, as noted above. This needs to be augmented by involving more users in other ways, however, because of their large number and wide dispersion throughout the Service. In addition to direct users, many other employees are impacted. They need to be included in the activities of the project in many ways, such as "internal marketing" and union involvement.

Employee participation is valuable not only for "buy-in," but for the substantive input employees can offer in the way of ideas and information based on their intimate knowledge of the work.

ISSUES:

Internal marketing: all affected IRS employees
Employee participation: affected employees
User participation: direct users
Labor relations program and union involvement
Role of field offices in participation: management roles

Process Cluster 5

Title: ENSURING SYSTEM USABILITY

One of the most powerful things a project team can do to achieve its goal is to test the new work system realistically during development, and revise it if it does not perform as needed. To test a work system realistically requires non-traditional methods. The new methods must focus on the work done by the user as much as on the work done by the non-user part of the work system.

One relatively new method that clearly does this is called a "usability laboratory." This method requires specialized facilities and testing procedures designed to reveal clearly what happens at the interface between the user and his or her workplace tools. This approach or alternative approaches need to be used by projects to examine usability.

ISSUES:

Usability labs
Alternative work system designs
Prototypes
Pilots
Variance analysis

Process Cluster 6

Title: MANAGING IMPLEMENTATION AND CHANGE

From the beginning of the project, the target of all the project activity is to eventually deliver a new work system to field sites, where it will be taken over and "owned" by users at those sites. A fundamental need is for information about the project of flow freely to all those who will be affected, from the earliest days of the project, then regularly throughout its life. This "public relations" task is essential, in order to counter the inevitable rumors, and to help others be alert to planning needs. Sharing project information is difficult because it changes constantly, and some issues are sensitive, but the alternative of withholding information can be very damaging.

Although there should be constant preparation for implementation throughout the life of the project, for example, through user participation, there are important project phases such as space acquisition and site preparation that are especially critical and highly visible. Flowing from these is the necessary transition to management by local site personnel, and applying staffing and support resources to enable full-scale operation.

ISSUES:

Publicity and information flow
Space acquisition
Site preparation
Transition
Implementation

CRITERIA USED FOR THE DESIGN OF WORK SYSTEMS

"Criteria clusters" are those that concern the desired qualities of the work system being designed; they are described starting on the next page.

To identify each *diagnostic question* uniquely for later use, they will be numbered according to the cluster to which they belong. For example, the third question in Criteria Cluster 2 would be "C2-3."

Criteria Cluster 1

Title: FUNCTIONAL AND ORGANIZATIONAL SPECIFICATIONS

The new work system must have a mission statement that is clear and specific. Functional divisions in the management of the work need to be established that facilitate operations and the work flow. The needs of employees, tax processing and automation technology need to be balanced in arriving at a proposed design.

The work system must have efficient spans of control and reporting relationships. Spans of control must be large enough to be economical and give freedom for subordinates to exercise authority, but small enough to give support. Chains of command need to be responsive. The staffing patterns must provide the type and grade of positions that get the job done economically, taking into account all of the workforce costs, including hiring, training, turnover and level of motivation.

Relationships among jobs and grades need to be logical and fair. Beyond the structural elements of organization, careful design attention must be given to the dynamic side of organizational behavior: formal and informal authority, power and information flow.

More than any other single cluster, this one involves the visible structure of the work system that results from the total design effort. Important as this is, it does not overshadow the value of the other thirteen clusters. In a sense, addressing the issues in this cluster serves to orchestrate or provide a framework for the contributions of all the others. Also, this integration happens in an accommodating or "give-and-take" manner within the design process. The clusters as presented here are not intended to be considered in a linear or sequential fashion. Instead, they should be worked through in parallel. It is true that often in project management training, the impression received is that a project follows a sequential execution of phases and stages; budget pressures and checkpoints tend to reinforce this. However, effective work design requires by nature the flexibility for iteration, learning and correction, and parallel but closely-linked activities. A challenge for the project manager is to support this design process within the more conventional understanding of project management.

ISSUES:

Functional requirements
Work system configuration documentation
(Organizational structure: span of control; delegation; reporting relationships; functional statements (IRM); staffing patterns, etc.)

DIAGNOSTIC QUESTIONS:

C1-1 What are the current organizational guidelines in IRM 1100 or elsewhere?

C1-2 What are the current management authorities and responsibilities, and spans of control?

C1-3 What are the current staffing levels for the occupation(s) in the regional offices, district offices, service centers, and National Office?

C1-4 Where are the users' offices organizationally, vis-a-vis other functional areas?

C1-5 How will other work processes and organizations be affected by the proposed change in work?

C1-6 How will present work need to be realigned? What are the options?

C1-7 What reporting relationships will change and how? What are the options?

C1-8 What levels of authority will need to be changed? What would be the most effective configuration?

C1-9 What new control systems will have to be created?

C1-10 What effect will the new system have on span of control?

C1-11 What position descriptions or elements and standards will have to be changed?

C1-12 Will the new work system cause any changes in grades of employees, supervisors or managers?

C1-13 Will any centralized processes be decentralized or vice versa?

C1-14 Will the new work system create any totally new jobs? Would this be a good solution?

C1-15 Will the new system cause the abolishment of any present jobs? What are the proposals for managing this process? What are the alternatives?

C1-16 Will the work in general become more demanding or less demanding on employees in terms of their skill level or skill range? In terms of stress?

C1-17 Will the new system create any unnecessary fragmentation of organizations?

C1-18 Will the new system require any new specialized organizations?

C1-19 Will the new system require work to be coordinated differently?

Criteria Cluster 2

Title: JOB CONFIGURATION

The description of the work in terms of functions and tasks needs to be further fleshed out to define the jobs, both traditional and newly-created, that are necessary. The jobs are defined by a coordinated set of specifications, which include position descriptions, critical elements and performance standards.

Performance standards must be developed for each job as part of the design process to establish the overall target performance level of the work system. In the analysis to determine appropriate standards, the potential contribution of the employee to work system performance is a separate issue from the potential contribution of the automated data processing functions of the system. When the designer finds himself or herself in the position of seeing "the machine drive the job," there are usually serious negative effects in store: stress, boredom, errors, turnover, difficulty in recruiting. A design solution has to be found that balances the overall cost of machine throughput and operator throughput as a system.

ISSUES:

Position management
Job specifications
Position descriptions
Critical elements
Performance standards
Interpersonal and social contacts
Inherent job satisfaction features

DIAGNOSTIC QUESTIONS:

C2-1 What position descriptions and elements and standards will have to be changed?

C2-2 Will the new performance requirements be set using employee input?

C2-3 How will those standards relate to present elements and standards?

C2-4 What impact will the new technology have on the knowledge and skills required of the employee to perform effectively?

C2-5 Will the employee be limited to a single position in the workplace, or be moving around in a variety of positions or places during the work period?

C2-6 How long will the employee be working at one task before moving to another? Is the rhythm or sequencing of tasks a satisfying and positive feature of the job?

Criteria Cluster 3

Title: PERFORMANCE APPRAISAL AND FEEDBACK

The best time to develop methods of appraising the performance of employees is along with the design of the other features of the work system. Each job must have a clear, efficient means of measuring performance and making use of this information to satisfy the needs of management and the employee.

The employee needs timely information on personal performance that is clear and fair, in order to know "where he or she stands." Management needs accurate and comprehensive information that it can use to make decisions about system adjustment. Also, a clear, fair system will help them motivate employees to meet performance standards.

ISSUES:

Performance appraisal system
Performance measurement for employees
Performance feedback to employee
Performance measurement for the work system
Performance feedback for the work system, captured in the management information system

DIAGNOSTIC QUESTIONS:

C3-1 How will the present appraisal system and techniques of performance monitoring and feedback of results be affected by the new technology?

C3-2 What are employees' and managers' perceptions of the present systems and techniques in terms of effectiveness and fairness?

C3-3 How do employees and managers perceive that the new technology will affect the way in which the performance appraisal system will work?

C3-4 How will the proposed changes impact on the role of the supervisor and manager in performance appraisal?

C3-5 Will the proposed technology make performance data more available or accessible? Should that data be used? If so, how will it be used?

C3-6 Can the performance standards be monitored by the new system?

C3-7 What information will the employee receive regarding performance?

C3-8 How will data on performance be captured to establish systemic performance indicators, as distinct from performance data on individual employees?

C3-9 Will performance measurement and feedback be included as a feature of the prototype, for evaluation?

C3-10 In what ways will the new system be able to provide information on employee performance to the manager?

C3-11 What skills or knowledge will the manager need to have to properly use the system information on performance?

Criteria Cluster 4

Title: REWARDS SYSTEM

"Rewards" refers here to all forms of compensation or gain experienced by the employee, including pay, bonuses, awards and benefits. The rewards system is one of the most powerful determinants of employee motivation. A "rewards package" for the employee needs to be keyed to performance standards and the design of appraisal methods, but also needs to take advantage of creative ideas.

ISSUES:

Rewards system
Pay
Bonuses
Non-monetary incentives

DIAGNOSTIC QUESTIONS:

C4-1 What new rewards can be established for employees as a result of the new system?

C4-2 What level of authority should financial rewards require under this system?

C4-3 What non-financial rewards are possible to enhance performance and job satisfaction?

C4-4 Can the rewards (financial and non-financial) be used at the group level, instead of the individual?

C4-5 What can be done to enhance the intrinsic rewards of the job, for example, through enhancing job content, to increase job satisfaction?

C4-6 Will employees be able to recognize behavior which will be rewarded?

C4-7 What changes will need to be made to the IRM and other documents and forms pertaining to rewards as a result of changes to the system?

C4-8 How will the reward system enhance the organization's goals?

Criteria_Cluster_5

Title: SOFTWARE ERGONOMICS

Ergonomics has been defined as "... the interaction between human beings, the equipment they work with, their work environment and how each element influences the others during the work activity." Several of the clusters discussed here have issues that can benefit from the application of ergonomic design principles. The design of the software from an ergonomic point of view is especially important in automated work systems.

The interface between employee and computer, by means of the keyboard and screen, involves the employee's exercise of control over his or her work, in the most minute detail. Through software design, a balance or dialogue is established between user and computer as one or the other initiates an action or gives a response. Getting this balance right is at the heart of optimizing the work system's technical and human potentials for maximum system output at a realistic cost.

ISSUES:

Design of dialogue with user: mode of screen presentation of work flow and task sequence; "language" of user/ screen interaction; accommodation of level of expertise

DIAGNOSTIC QUESTIONS:

C5-1 Is the information on the screen easy to read?

C5-2 Is it easy to find information you need that is not on the current screen?

C5-3 Are the menus easy to use?

C5-4 Are "reminders" given when needed, and used appropriately?

C5-5 Is information that a manager needs provided efficiently on the screens?

C5-6 Is information that a supervisor or work leader needs provided efficiently on the screens?

C5-7 Is information that any supporting employee needs (such as an analyst other than the "target" occupation, a clerk or a quality assurance employee) provided efficiently on the screens?

C5-8 Is there a consistent organization and location on the screen of the various display features from one screen to another?

C5-9 Are consistent codes and symbols used from one screen to another?

C5-10 Can an item of data be entered only once, then accessed by the software whenever needed later, without having to be re-keyed?

C5-11 Does the computer respond quickly (0.2 seconds maximum for normal operations) to acknowledge data entries and feed back response, so that the operator is not slowed or paced by delays?

C5-12 Can users pace their own data entry and not be penalized if they fail to "keep up" with a computer-determined pace?

C5-13 Can users change previous entries if necessary by deletion-and-insertion actions, or typeover, through simple editing procedures?

C5-14 Is there an appropriate division of tasks between the user and the software?

Criteria Cluster 6

Title: WORKPLACE DESIGN

Traditional job specifications tend to address only partially the design of the job from an ergonomic perspective; that is, providing a workplace environment that accounts for the wide range of employee needs. Ergonomic analysis and design focuses on these needs. These include space, movement, logic of use, and many others, aimed at improving comfort, minimizing fatigue, increasing job satisfaction and ultimately increasing the product quantity and quality delivered by the employee.

ISSUES:

VDT screen visual characteristics and performance
Physical configuration of workplace

DIAGNOSTIC QUESTIONS:

C6-1 Will furniture have basic dimensions and adequate features of adjustability and support to provide comfort for the user over the full work shift?

C6-2 Will the layout of the workplace be convenient for the activity required by the job?

C6-3 Will features of the workplace be able to be adjusted by the user to suit special personal needs and preferences (e.g., footrests)? (See also Cluster 13)

C6-4 Will the work space be able to accommodate both work and some personal items (clothing, photos, coffee mugs, etc.)?

C6-5 Is safety promoted by the design of the workplace?

C6-6 What provisions will be made for readability of CRT displays?

C6-7 Will keyboards be detached and adjustable so that a comfortable working position can be achieved?

C6-8 Will the keyboard have positive usability features such as a separate number pad, non-reflective keys and desirable "touch?"

C6-9 Will the monitor screen have adjustments such as tilt and swivel to enable the user to reach the best position?

Criteria Cluster 7

Title: JOB INSTRUCTIONS

No matter how carefully the work system and the individual jobs are designed, once the system is "on line," the history of the development tends to be lost, and the only remaining guidance for users is instructional material of various kinds. This material includes desk guides, job aids, printed and electronic forms used in the work process, training documents and the IRM. It is important that these materials be clear and non-contradictory. They should be easily accessible and up-datable. This is an important project responsibility requiring cross-functional coordination.

ISSUES:

Forms design and specifications (any forms involved in the work process)
Job instructions and procedures; desk guides and job aids
Developing or changing the IRM and other documents or publications that address methods or procedures for the work

DIAGNOSTIC QUESTIONS:

C7-1 Will job instructions be developed using the input of both technical specialists and users?
C7-2 Will provisions be made to revise the job instructions whenever the results of new learning about the system are available?

C7-3 Will a standardized, up-dated orientation be available so that each future new user will get the same baseline information about the job?

C7-4 Will paper or electronic forms used in the system be designed concurrently with other system components, based on the same design information, to minimize inconsistencies, and take advantage of opportunities to make their use simpler and more logical?

C7-5 Will proposed forms revisions be coordinated with all users before finalizing?

Criteria_Cluster_8

Title: WORK ENVIRONMENT

There are several important aspects of the larger work environment in addition to those identified in the "Workplace Design" cluster, above. These concern features of the physical environment that support the comfort and health of the employee, and provide services to meet important employee needs. Examples are: air quality, safety, physical security, health and fitness programs, child care and counseling.

ISSUES:

Site, office and workstation physical environment
Safety
Physical security
Health
Fitness issues
Counseling, child care and related services

DIAGNOSTIC QUESTIONS:

C8-1 What are the potential impacts on the health and well-being of the employees involved?

C8-2 What opportunities or possibilities does the proposed system present to enhance the office environment?

C8-3 What new threats to the security of data are present in an automated system in the workplace, compared to the former system?

C8-4 What new provisions need to be made for physical security, physical access and personnel clearance in the workplace?

C8-5 What procedures need to be available for response to threats to employees or data or physical property?

C8-6 What procedures need to be available for recovery from losses due to power outages, storms, floods, fires, etc.?

C8-7 What backup procedures and security awareness training need to be provided?

C8-8 What new items of property will have to be controlled, inventoried, stored and protected against theft, damage or loss?

C8-9 What planning issues and impacts arise around the need for new space, communication lines, heating and air conditioning, raised flooring, smoke detection, sprinklers, etc.?

Criteria_Cluster_9

Title: WORKFORCE PLANNING

In staffing the new work system, we need to draw from both the internal work force and the external labor pool. In both cases, a database of demographics needs to be established to show the "knowledges, skills and abilities" represented among available candidates. This is a starting point for the traditional tasks of recruiting, selecting and training employees. In addition, programs supporting the new work system need to be designed to assure professional development of employees, succession planning and any redeployment actions caused by the project.

ISSUES:

Workforce and labor force demographics
Recruitment
Selection
Professional development
Succession planning
Redeployment

DIAGNOSTIC QUESTIONS:

C9-1 What knowledges, skills and abilities will be required for employees to perform successfully in the new work system?

C9-2 What new recruitment strategies and requirements will be necessary for both internal and external recruitment?

C9-3 How will internal promotions be affected by the new system?

C9-4 What career ladders can be established or need to be changed to be compatible with the new work system?

C9-5 What is the likelihood of redeployment of personnel, and how would redeployment decisions about individuals be made?

C9-6 What manuals, documents or forms pertaining to selection and recruitment will need to be modified?

C9-7 Will the availability of certain skills or the nature of the job market affect the choice of technology?

C9-8 What are the characteristics of the current and proposed workforce (including such indicators as age, grade, series, gender, training, etc.)?

C9-9 If geographic relocations or new locations are anticipated, what are the economic profiles of the sites being considered (in terms of indicators such as labor force quality and availability, employment rates, wage rates, growth trends, etc.?

C9-11 How will managers be involved in designing the developmental requirements of the employees?

Criteria Cluster 10

Title: SUPERVISORY PRACTICES

Information technology brings with it new responsibilities for supervisors and managers, and the need for them to develop new skills in areas such as: (1) introducing employees to change; (2) involving employees in the implementation, fine-tuning and "ownership" of the work system; and (3) helping to facilitate union involvement in the new labor relations issues.

ISSUES:

Supervisory style
Supervisory practices
Skills and responsibilities of supervisors

DIAGNOSTIC QUESTIONS:

C10-1 Will the supervisors and managers in units affected by the changes participate in system design decisions?

C10-2 Will these managers receive training in the new system?

C10-3 What job aids will be prepared for these managers?

C10-4 What role will these managers take in meeting their employees' needs in making the transition to the new system?

C10-5 How will the duties of these managers change when the new system is in place (e.g., new performance appraisal procedures)?

C10-6 What new duties will these managers have due to the new system?

Criteria Cluster 11

Title: TRAINING

Traditional training support such as needs analysis, initial training and cross-training apply to the design and development of new work systems. Also, information technology provides an opportunity for embedded training, which has advantages of flexibility and data processing power for the varying needs of users in transition to "automated" work.

ISSUES:

Training system
Cross-training
Multi-skilling
Initial training
Embedded training
Continuing training

DIAGNOSTIC QUESTIONS:

C11-1 Given the new performance requirements, what new knowledges, skills and abilities will employees need to have?

C11-2 How can organizational leaders be involved in the training as a means of communicating the change in organizational direction?

C11-3 What alternative forms of training are available to continue the employee development process?

C11-4 What is an initial estimate of resources needed to do the training?

C11-5 What budgeting has been done for the training? What additional information is needed for this budgeting?

C11-6 When will the training need to take place?

C11-7 What special training needs will managers have?

C11-8 How will training be linked to performance appraisal to account for the "learning curve?"

C11-9 How will managers be involved in designing the developmental requirements for employees?

C11-10 Will the principle of multi-skilling be applied, as as basis for job rotation and career growth?

Criteria Cluster 12

Title: CAREER PATHS

Each job that is part of the new work system should have career potential to help make it attractive to employees. This requires, in addition to career-related issues mentioned above, a planned relationship between the new jobs and others in the organization. Development of career ladders and programs of cross-training would help to achieve this.

ISSUES:

Employee mobility
Career paths

DIAGNOSTIC QUESTIONS:

C12-1 How will internal promotions be affected by the new system? On what basis will decisions on promotions be made?

C12-2 What new career ladders can be established for the organization as a result of the changes? What existing career ladders will need to be modified?

C12-3 Will a program of job rotation and career growth be designed, based on multi-skilling and cross-training, to give more flexibility in staffing, and more job satisfaction and career potential?

Criteria Cluster 13

Title: ACCOMMODATION OF EMPLOYEES WITH DISABILITIES

Traditionally, jobs are modified well after they are structured and implemented, whenever a need arises to accommodate employees with special needs. These may be employees who have impaired vision, hearing, speech or mobility, or other qualities that need to be accommodated on the job in order to give equitable treatment to the employee. However, instead of devising reactive "fixes," the design process for work systems should look ahead to the need to accommodate these employees, who make up a part of the Service's workforce that is substantial, and likely to grow. This accommodation starts when responding to issues in the "Job Configuration" cluster, and needs to carry through when making several other design decisions, such as those concerning performance standards and workplace design.

(See "Managing End User Computing for Users With Disabilities," General Services Administration, Information Resources Management Service, (202) 523-1906, for information on design options and the requirements of Public Law 99-506, Section 508).

ISSUES:

Accommodation of disadvantaged employees
Remedial training
Developmental job progression

DIAGNOSTIC QUESTIONS:

C13-1 Will software include the use of macros to enable users to enter long strings of characters with few keystrokes?

C13-2 Will software enable sequential keying for commands that conventially require the simultaneous pressing of two or more keys (e.g., CTRL-ALT-DEL)?

C13-3 Will screens include both visual and auditory cues?

C13-4 Will screens have the capability of displaying large characters and graphics when needed?

C13-5 If color contrasts are used to impart information in screens, will another redundant method be used for color-blind users?

Criteria Cluster 14

Title: RECORDS MANAGEMENT

The design and management of records is especially complex for automated work systems because of the need to manage a mixture of paper and electronic records. Also, as more and more paper forms are replaced by electronic images, there is a need to develop and prove out new guidelines and methods for the verification, storage, retrieval and disposal of the growing proportion of the new type of records.

ISSUES:

Design, storage, access, control and integrity of records and documents (electronic or paper)

DIAGNOSTIC QUESTIONS:

C14-1 What forms are used throughout the work system? What organizations use them, at what locations and in what numbers?

C14-2 What documentation exists in the IRM regarding these forms?

C14-3 How are changes coordinated to control the impact of a change on one form affecting another?

C14-4 What forms are mailed to taxpayers? Internal mail systems? Other mailings? What issues exist around use of envelopes, addressing, etc.?

C14-5 What data do we need, and what decisions need to be made, about securing of records? Length of time to be retained? Conditions for access and disclosure?

C14-6 To what extent will the new system involve a mixture of paper and electronic records? What new or special requirements will there be around the indexing, archiving, securing and disposing of electronic records? How will these decisions be affected by the medium used for the electronic records (tape, magnetic disk, laser disk, etc.)?

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